

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)

REC'D 18 JUN 2004
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Applicant's or agent's file reference 15236/WO/02	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/IL 03/00192	International filing date (day/month/year) 10.03.2003	Priority date (day/month/year) 14.03.2002
International Patent Classification (IPC) or both national classification and IPC F02C3/055		
Applicant NEWTON PROPULSION TECHNOLOGIES LTD. et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 7 sheets.

3. This report contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 10.10.2003	Date of completion of this report 17.06.2004
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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/IL 03/00192**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-30 as originally filed

Claims, Numbers

1-27 filed with telefax on 26.04.2004

Drawings, Sheets

1/17-17/17 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos. 3-10,12-27

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 3-10,12-27 are so unclear that no meaningful opinion could be formed (*specify*):

see separate sheet

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for the said claims Nos.

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the Standard.

☐ the computer readable form has not been furnished or does not comply with the Standard.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1,2,11
Inventive step (IS)	Yes: Claims	
	No: Claims	1,2,11
Industrial applicability (IA)	Yes: Claims	
	No: Claims	1,2,11

2. Citations and explanations

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Re Section III

The dependent claim 3 is not clear as in feature b) thereof, it is referred to "the corresponding independent flow path" without any such flow path having been introduced in claim 1 or in claim 3.

The meaning of "independent flow path", in features b),c) and e) of claim 3, with respect to the matter of claims 1 and 3 is not clear.

Feature c) seems to suggest a heat source in the means for feeding compressible fluid to said first volumetric device.

Claim 3 being unclear, thus rendering claims 4-10 and 12-27, which all include the features of claim 3, unclear.

Re Section V

Document D1 (DE-A-4 241 403) discloses, cf. page 8, lines 16-33; figure 8 and to which the following reference numerals correspond, an engine system, comprising a first volumetric device (Ansaug-Verdichterrotoreinheit 74), and a second volumetric device (Expansions-Ausstoß-Rotoreinheit 90) in which said second volumetric device (90) is larger in volume than said first volumetric device (74) (this characteristic being inherent for this kind of devices, cf. also figure 8), in which, during continuous flow (cf. in particular page 8, line 16,22,23) of a compressible fluid from said first (74) to said second (90) volumetric device work is performed.

The subject-matter of claim 1 therefore lacks the required novelty.

The further features of dependent claims 2 and 11 are known from document D1 and they do not add anything novel to the matter of claim 1.

An amended claim 1 including the features that the engine system includes separate flowpaths, each flowpath beginning with a separate intake conduit (94,94A) leading to the first volumetric device (60) and ending with a separate exhaust conduit (95,95A) coming from the outlet of the second volumetric device (70), each separate flowpath including a heat source (75,75A) and the further features of claims 1 and 3 would define subject-matter which seems neither disclosed in any of the documents cited in the international search report, nor deductible in an obvious manner therefrom.

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CLAIMS

1. Engine system, comprising at least a first volumetric device, and a second volumetric device in which said second volumetric device is larger in volume than said first volumetric device, in which, during continuous flow of a compressible fluid from said first to said second volumetric device work is performed.
2. Engine system according to claim 1, further comprising a turbine driven by the fluid discharged from the second volumetric device.
3. Engine system according to claim 1, which comprises:
 - a) a first volumetric device;
 - b) means for feeding a compressible fluid to said first volumetric device via the corresponding independent flow path;
 - c) a heat source for each independent flow path;
 - d) means for driving said first volumetric device for sequentially transferring controlled volumes of said fluid to the corresponding heat source by positive displacement cycles;
 - e) a second volumetric device for receiving heated controlled volumes of said fluid from the corresponding heat source via the corresponding independent flow path;

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- f) means for driving said second volumetric device for sequentially discharging said heated controlled volumes of said fluid by positive displacement cycles; and
- g) means for synchronizing said means for driving said first and second volumetric device.

4. Engine system according to claim 3, wherein the means for synchronizing the means for driving the first and second volumetric devices comprise a common shaft supporting said first and second volumetric devices for rotation.

5. Engine system according to claim 3, wherein the means for feeding a compressible fluid to a first volumetric device include a compressor.

6. Engine system according to claim 2, wherein the discharge of the second volumetric device is the inlet of the turbine.

7. Engine system according to claim 3, wherein the heat sources are combustors fed with a fuel, which receive controlled volumes of fluid and cause said fuel to burn, thereby heating and expanding said fluid.

8. Engine system according to claim 3, wherein the first and second volumetric devices are keyed to the same main shaft.

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9. Engine system according to claim 8, comprising a compressor keyed to the main shaft.

10. Engine system according to claim 8, comprising a turbine keyed to the main shaft.

11. Engine system according to claim 1 or 3, wherein the compressible fluid is air.

12. Engine system according to claim 3, wherein the heat source is a combustion chamber into which fuel is injected and the compressible fluid is air.

13. Engine system according to claim 3, wherein the positive displacement cycle is effected by means of apparatus selected from the group consisting of rotors provided with lobes, Wankel mechanism, reciprocating piston systems, or any common or specially designed volumetric mechanism.

14. Engine system according to claim 3, further comprising at least one compressor for increasing the pressure of each controlled volume of fluid.

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15. Engine system according to claim 14, further comprising at least one turbocharger.

16. Engine system according to claim 3, further comprising at least one stage of intercoolers.

17. Engine system according to claim 3, comprising two independent shafts to one of which are koved the volumetric devices, a load being coupled to the other shaft.

18. Engine system according to claim 17, further comprising a clutch for engaging and disengaging the two independent shafts, depending on a magnitude of the load.

19. Engine system according to claim 15, further comprising a secondary heater.

20. Engine system according to claim 14, further comprising a second compressor and a first stage intercooler for cooling the discharge flowing from the first compressor to said second compressor.

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21. Engine system according to claim 20, further comprising a turbocharger and a second stage intercooler for cooling the discharge flowing from the second compressor to the turbocompressor of the turbocharger.

22. Motor vehicle propulsion system comprising an engine system according to claim 3 and further comprising a secondary heater for heating exhaust from said system and a third volumetric device rotating about an independent shaft, wherein the discharge from said secondary heater is the working fluid of said third volumetric device, said third volumetric device being adapted to be a torque converter in response to a variable load coupled to said independent shaft, said engine system further comprising a rotational direction controller of said independent shaft by a valve means which directs said discharge from said secondary heater alternatively to an inlet port and an outlet port of said third volumetric device.

23. Motor vehicle propulsion system according to claim 22, further comprising a transmission comprising:

- a) a plurality of coaxial volumetric devices rotatable about the independent shaft;
- b) a plurality of conduits through which the discharge from the secondary heater flows in parallel to each of said plurality of volumetric devices, respectively;

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c) a plurality of selector valves provided with each of said plurality of volumetric devices, respectively, for changing the rotational direction of the independent shaft by directing the flow through a corresponding conduit alternatively between the inlet port and outlet port of the corresponding volumetric device upon actuation of each of said selector valves in unison; and

d) a plurality of selector valves in communication with each of said conduits, respectively, for selecting through which combination of said plurality of volumetric devices discharge from the secondary combustor will flow,

wherein said motor vehicle propulsion system produces a maximum amount of torque when the discharge from the secondary combustors is directed to all of said plurality of volumetric devices in parallel, a lowered level of torque upon deactivation of at least one of said volumetric devices, and an increased level of torque upon activation of at least an additional one of said volumetric devices.

24. Motor vehicle propulsion system according to claim 22, further comprising a bypass valve to serve as engage and disengage device between the motor assembly and torque converter assembly so that torque converter can be repressed while the motor is operating.

25. Motor vehicle propulsion system according to claim 22, further comprising a heat source.

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26. Turbofan engine system comprising an engine system according to claim 9, wherein the compressor is a turbocompressor driven by discharge from the expansion volumetric device and a fan driven by said engine system, said fan generating a crossfan streamline and a main thrust for an aircraft, exhaust from said turbocompressor being discharged to the atmosphere and providing auxiliary thrust in addition to said main thrust.

27. Turbojet engine system, comprising an engine system according to claim 9 and further comprising a main combustor generating a gas stream providing a main thrust for an aircraft.

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